

Engineering Analysis
AMVAC
503-0048
Tribufos Process

On October 18, 2011, the Department received an air permit application from AMVAC Chemical Corporation located in Axis, AL. Additional information was received on November 10, 2011. The application requested that AMVAC be allowed to construct a new production area to manufacture the product Tribufos. AMVAC currently produces Tribufos along with various other products in the Pesticide, Insecticide, and Fungicide Chemical process unit under existing Synthetic Minor Operating Permit (SMOP) 503-0048-Z018. The existing process unit would continue to produce other products. The facility would maintain its PSD/ Title V synthetic minor status after the proposed modifications.

Tribufos Process

Tribufos is produced by oxidizing phosphite with hydrogen peroxide. This product is purified by aqueous washings, steam stripped of solvent and impurities, and dried. The purified liquid Tribufos is transferred into a storage tank. Vent gases from the process would be incinerated and neutralized. Impurities in the wash waters would be treated and disposed of properly. Phosphite would be supplied from an outside source for the first campaign. AMVAC would update the application to include phosphite production onsite at a later date.

The following major equipment would be installed in association with the Tribufos process:

- 1) Oxidation Reactor (4,000 gallon)
- 2) Hydrolysis Reactor (5,000 gallon)
- 3) Wash Reactor (5,000 gallon)
- 4) Aqueous Extraction Feed Vessel
- 5) Stripper Feed Vessel (10,000 gallon)
- 6) DBDS Stripper Column
- 7) Acidic Extraction
- 8) Bleach Treatment
- 9) Phosphite Storage Tank (V-414)
- 10) Tribufos Storage Tank (V-408)
- 11) Organic Waste Storage Tank (V-407)

The Tribufos process would utilize four existing storage tanks (T-101, T-103, T-P104, and T-P1122) along with three new storage tanks (V-414, V-408, and V-407). The tanks utilized by the Tribufos process, permit status, proposed storage liquid, installation dates, capacities, and vapor pressures are listed below in Table 1. Based on the vapor pressure of the materials stored, no changes in any regulatory applicability are expected.

Table 1 - Tribufos Process Storage Tanks					
Tank ID	Permit Status	Proposed Storage Liquid	Installation Date	Capacity (Gallons)	Vapor Pressure (psia @ °F)
T-101	Unpermitted	Sodium Hydroxide	1981	23,800	0.47 @ 80
T-103	Unpermitted	Hydrogen Chloride	1981	9,400	1.37 @ 80
T-P104	Z019	Toluene (General VOCs)	1981	32,000	0.60 @ 80
T-P1122	Unpermitted	Hydrogen Peroxide	2010	8,000	0.50 @ 85
V-414	Unpermitted	Phosphite (General VOCs)	2012	10,000	0.0002 @ 85
V-408	Unpermitted	Tribufos (General VOCs)	2012	8,500	0.002 @ 140
V-407	Unpermitted	Organic Waste (General VOCs)	2012	12,000	0.60 @ 80

Emissions

Emissions from the Tribufos unit would vent to the Vent Gas Incinerators (VGIs) (F-P1161 and F-P1162) and the scrubbers associated with each VGI. Emissions from the storage tanks in the Tribufos unit would also vent to the VGIs, with the exception of tank T-P1122 which would vent to the atmosphere. The emissions from tanks venting to the VGIs would be minimal. Only one VGI is, and would continue to be, in operation at any given time, while the other is on standby. AMVAC has claimed a removal efficiency of 99.9% for the VGIs and scrubber. The potential emissions (point sources) and the emission factors for each pollutant for the Tribufos process are shown in Table 2. The potential emissions (fugitives) and the emission factors for each pollutant for the Tribufos process are shown in Table 3. The potential emissions (total) for the Tribufos process are shown in Table 4.

The potential emissions for the Tribufos process are based on a production capacity of 4,000,000 pounds per year. The facility would continue to stay within the existing facility wide total HAP and individual HAP limits of 24.0 and 9.0 tons per year, respectively, in any consecutive rolling 12-month period.

Table 2 - Potential Emissions, Tribufos Process (Point Source)		
	Emissions Factors *	Potential Emissions
Pollutant	Pounds/Pound of Product	Pound/Year
HCl	3.30E-07	1.32
Toluene	7.50E-13	3.00E-06
VOCs	2.50E-07	1
SO ₂	1.74E-04	696
CO ₂ e	4.80E-04	1920

* Based on Mass Balance

There is one point Source, the Vent Gas Incinerator (VGI)

Table 3 - Potential Emissions, Tribufos Process (Fugitives)		
	Emissions Factors *	Potential Emissions
Pollutant	Pounds/Pound of Product	Pound/Year
HCl	2.50E-07	1
Toluene	1.60E-06	6.4
VOCs	1.60E-06	6.4

* Based on Engineering Estimate

Table 4 - Potential Emissions, Tribufos Process (Total)			
Pollutant	Potential Emissions (Point Sources) Tons/Year	Potential Emissions (Fugitives) Tons/Year	Potential Emissions (Total) Tons/Year
HCl	6.60E-04	5.00E-04	1.16E-03
Toluene	1.50E-09	3.20E-03	3.20E-03
VOCs	5.00E-04	3.20E-03	3.70E-03
SO ₂	3.48E-01	-	3.48E-01
CO ₂ e	9.60E-01	-	9.60E-01

Emissions from the Tribufos process combined with the potential emissions from existing production areas would be less than the major source thresholds as well as existing HAP limits. A report detailing the actual emissions is currently, and would continue to be, submitted to the Department on a quarterly basis.

PSD / Title V

AMVAC is currently a synthetic minor source with respect to PSD. Criteria pollutants are not expected to be emitted in significant quantities from the Tribufos process or the seven storage tanks. Therefore, a PSD analysis would not be required. AMVAC would continue to limit HAP emissions to less than 10 tons per year for any individual HAP and 25 tons per year for any combination of HAPs, thus the source would continue to be a synthetic minor source with respect to PSD and Title V. Since the VGIs would be used to restrict the potential to emit, AMVAC would be required to maintain the combustion temperature of greater than 1,400°F to achieve the 99.9% removal efficiency.

NSPS / NESHAPs / MACTs

There are no New Source Performance Standards (NSPS) (40 CFR Part 60), National Emissions Standards for Hazardous Air Pollutants (NESHAPs) or MACTs (40 CFR Part 63) applicable to the Tribufos process or for the storage tanks. The storage tanks would not be subject to NSPS Subpart Kb due to the vapor pressure of the materials stored. Also, no National Emissions Standards for Hazardous Air Pollutants for Area Sources (40 CFR Part 63) would apply to this facility as a result of these modifications.

State Regulations

The Department reviewed the applicability of the State Regulations found in ADEM Admin Code 335-3-6-.03 to the storage tanks associated with Tribufos unit. Code 335-3-6-.03 applies to the storage of VOCs with a true vapor pressure greater than or equal to 1.5 psia under storage conditions. None of the storage tanks associated with the Tribufos unit would be subject to this regulation based on the vapor pressure of the materials stored.

Air Toxics / Coastal Consistency / Class I

No significant quantities of hazardous air pollutants would be expected to be emitted from this process; therefore, an air toxics analysis would not be required at this time. The AMVAC facility is not located within the 10 foot contour line, thus a coastal consistency review would not be required. AMVAC is not located within a 100 km radius of the Breton Class I Area and would not be subject to PSD. Thus no significant impact is expected on this Class I Area.

Odors

Based on the small amount of emissions associated with this process unit, odors should not be an issue from this project.

Recommendation

Since it appears that this modification would be capable of meeting all applicable state and federal requirements, I recommend that AMVAC be issued Synthetic Minor Source Operating Permit 503-0048-Z082 with appropriate emissions limits placed in the attached provisos, pending the results of a required 15 day public comment period.

503-0048-Z082 Pesticide, Insecticide, and Fungicide Chemical Processes

Jeremy Weant
Industrial Chemicals Section
Chemical Branch
Air Division

January 6, 2012
Date